

REMARKS

Claims 1-2, 4, 7-19, 21-22 and 25-33 remain in the application and claims 34-45 are new. Claims 2, 7 and 19 have been amended and claims 1, 4, 8-18, 21-22 and 25-33 remain unamended. Support for new claims 34 and 36-37 is found on page 11 lines 10-24 and Figs. 1-3 of the specification as filed, thus, no new matter has been introduced. Support for new claims 35 and 38-45 is found on pages 10-12 and in Figs. 1-3 of the specification as filed, thus, no new matter has been introduced.

In the *Office Action*, the Examiner indicated that claim 20 has been treated as withdrawn. *Office Action*, ¶ 1. Applicants acknowledge that claim 20 was withdrawn in the June 6, 2005 Response to Restriction Requirement and Election of Species.

The Examiner also maintained the Species Restriction Requirement, but revised the Restriction Requirement by treating claim 7 as generic. *Office Action*, ¶ 2. Applicants acknowledge with appreciation that claim 7 has been treated as generic.

In addition, the Examiner objected to the specification and required appropriate correction. *Office Action*, ¶ 3. Applicants have amended page 12 lines 12-14 of the specification as follows: "This can allow for greater extent of recovery of xenon from the gas stream for recirculation to the chamber ~~100~~ 102, so that the purge gas recirculated to the pump 104 contains a lower level of xenon." Applicants respectfully submit that the objection to the specification has been overcome and respectfully request withdrawal of the objection to the specification.

The Examiner also objected to claim 7 as lacking proper antecedent basis. *Office Action*, ¶ 4. Applicants have amended claim 7 to claim "recirculating the first gas from the separating means." Applicants submit that amended claim 7 now has proper antecedent basis and respectfully request withdrawal of the objection to amended claim 7.

The Examiner rejected claims 1, 7-8, 12-19, 22, 25-27 and 30-33 under 35 U.S.C. § 102(e) as being anticipated by "Melnychuk et al. (6,815,752)." However, Applicants note that U.S. Patent No. 6,815,752 is issued to Takuya Kitamura whereas U.S. Patent No. 6,815,700 is issued to Melnychuk et al. Applicants have proceeded on the basis that the Examiner's rejections are founded on U.S. Patent No. 6,815,700 ("Melnychuk et al."). Applicants respectfully traverse the rejections of claims 1, 7-8, 12-19, 22, 25-27 and 30-33 and seek favorable reconsideration in view of the following remarks.

In support of the rejection of claim 1, the Examiner cited *Col. 9 lines 43-48* of Melnychuk et al. which discloses that “[g]as exhausted through port 14 may also be exhausted to the atmosphere. . . [a]lternatively, the helium and/or the active gas may be separated and recirculated.” Notably, the cited portion of Melnychuk et al. refers to *Fig. 2C* (see *Col. 8 line 62*) whereas *Fig. 2C* does not appear anywhere in the Melnychuk et al. disclosure thereby making it unsupported. Applicants respectfully submit that independent claim 1 is not anticipated by Melnychuk et al. Claim 1 claims that the “supply means [is] arranged to receive from the gas separating means the recovered purge gas.” Melnychuk et al. fail to disclose or even suggest that the “supply means is arranged to receive from the gas separating means the recovered purge gas.” (emphasis added). Accordingly, Melnychuk et al. fail to disclose each and every element claimed in claim 1.

In support of the Examiner’s rejection of claim 1 that the elements “means for supplying a second, purge gas to be pumped with the first gas” (claim 1) are anticipated by Melnychuk et al., the Examiner cited *Fig. 1* of Melnychuk et al. and that “lithium can...be pumped from the chamber along with the helium buffer gas using standard turbo-molecular pumping technology” *Col. 6 lines 39-40*(emphasis added). Applicants respectfully submit that the cited portion of Melnychuk et al. supports the disclosure of a vacuum pump for removing lithium and helium from a chamber (*Col. 6 lines 39-40* and *Fig. 1*) and not a “means for supplying a second, purge gas to be pumped with the first gas” as claimed in claim 1. (emphasis added). Accordingly, for this further reason, claim 1 is not anticipated by Melnychuk et al.

Claims 7-8 and 12-16 depend either directly or indirectly from independent claim 1. Accordingly, at least for the foregoing reasons with respect to claim 1, Melnychuk et al. also fail to anticipate claims 7-8 and 12-16.

The Examiner rejected independent claim 17 as being anticipated by Melnychuk et al. In support of the rejection, the Examiner identified element 14 of *Fig. 1* as a gas separating means, and elements 4 and 12 in *Fig. 18C* as a first gas supply means and a second gas supply means, respectively. The Examiner further identified element 12 in *Fig. 1* as a pump and cited *Col. 9 lines 47-48* which, in reference to *Fig. 2C*, discloses that “the helium and/or the active gas may be separated and recirculated.” Claim 17 claims “a gas separating means for...outputting the recovered first gas to the first gas supply means...and outputting the recovered second gas to the second gas supply means for recirculation through at least the pump.” Applicants respectfully

submit that Melnychuk et al. fail to disclose a gas separating means “outputting the recovered first gas to the first gas supply means...and the recovered second gas to the second gas supply means” as claimed in claim 17. In contrast, Melnychuk et al. disclose that the recovered helium is directed to the hollow light tube (see *Fig. 1*; *Col. 14 lines 10-12*) and fail to disclose that the recovered gas is outputted to its source as claimed in claim 17. Moreover, notwithstanding the Examiner’s assertion to the contrary, it appears that Melnychuk et al.’s disclosure that “helium and/or the active gas may be separated and recirculated” simply does not disclose a gas separating means “outputting the recovered first gas to the first gas supply means...and the recovered second gas to the second gas supply means” as claimed in claim 17. Accordingly, Applicants respectfully submit that Melnychuk et al. do not anticipate independent claim 17.

The Examiner rejected claim 19 as being anticipated by Melnychuk et al. The Examiner asserted that Melnychuk et al. disclose “a second, purge gas (helium).” *Office Action*, ¶ 6. The Examiner also referred to various elements of *Fig. 1* of Melnychuk et al. and cited *Col. 9 lines 47-48* which disclose with respect to *Fig. 2C* that “the helium and/or the active gas may be separated and recirculated.” Applicants respectfully submit that amended independent claim 19 is not anticipated by Melnychuk et al. Amended claim 19 claims a method of vacuum pumping comprising “receiving at a pump...a second, purge gas...; recovering the second gas...and recirculating the second gas through at least the pump.” Applicants submit that Melnychuk et al. fail to disclose “recovering the second gas...and recirculating the recovered second gas through at least the pump.” (amended claim 19, emphasis added). In contrast, Melnychuk et al. disclose that the recovered helium is directed to the hollow light tube rather than to the suction pump. *Fig. 1*; *Col. 14 lines 10-12*. Accordingly, amended claim 19 is not anticipated by Melnychuk et al.

Claims 22, 25-27 and 30-33, depend either directly or indirectly from amended claim 19. Thus, for at least the reasons set forth above with respect to claim 19, claims 22, 25-27 and 30-33 are also not anticipated by Melnychuk et al.

The Examiner rejected claim 2 under 35 U.S.C. § 103(a) as being obvious in view of Melnychuk et al. in combination with U.S. Patent No. 4,995,794 (“Wycliffe”). The Examiner asserted that although Melnychuk et al. “do not expressly teach that the supply means is arranged to supply the purge gas directly to the pump [as claimed in claim 2,]...Wycliffe teaches” these elements of claim 2. *Office Action*, ¶ 8. Applicants have amended claim 2 to claim that “the

pump supply means is arranged to supply receive the recovered purge gas ~~directly to the pump.~~” Support for the amendments to claim 2 is found in original claim 2 and in Figs 1-2 as filed; no new matter has been introduced. Applicants submit that these amendments to dependent claim 2 have obviated the rejection. Amended claim 2 is directed to a vacuum pumping system “wherein the pump is arranged to receive the recovered purge gas.” As discussed above with respect to independent claims 1, 17 and 19, Melnychuk et al. disclose that the recovered helium is directed to the hollow light tube (see *Fig. 1; Col. 14 lines 10-12*); however, Melnychuk et al. fail to disclose that “the pump is arranged to receive the recovered purge gas” as claimed in amended claim 2. Similarly, Wycliffe discloses a nitrogen purge for a vacuum pump, but fails to disclose or even suggest a “gas separating means for...recovering the purge gas” wherein “the pump is arranged to receive the recovered purge gas” as claimed in claim 1 and amended claim 2. (emphasis added). Accordingly, neither Melnychuk et al. nor Wycliffe, either alone or in combination disclose or achieve the invention as claimed in amended claim 2.

The Examiner rejected dependent claim 4 under 35 U.S.C. § 103(a) as being obvious in view of Melnychuk et al. in combination with U.S. Patent Nos. 5,236,562 (“Okumura et al.”) and 5,836,746 (“Maruyama et al.”). The Examiner asserted that although Melnychuk et al. “do not expressly teach a second pump having an inlet for receiving the gas stream from the first-mentioned pump [as claimed in claim 4],...Okumura et al. teach a vacuum pumping assembly (Fig. 1) with a roughing pump (C) in series after a turbo-molecular pump (B).” *Office Action*, ¶ 9. The Examiner further stated that it would have been obvious to combine Melnychuk et al. with Okumura et al. and Maruyama et al. “for the benefit of creating a pressure that helps the turbo-molecular pump to operate (Maruyama et al. *Col. 2 lines 24-36*).” *Office Action*, ¶ 9. Assuming arguendo, even if Okumura et al. and Maruyama et al. in combination with Melnychuk et al. teach “a second pump having an inlet for receiving the gas stream from the first-mentioned pump and an outlet for exhausting the gas stream to the gas separating means,” neither reference teaches a “means for supplying a second, purge gas to be pumped with the first gas...the supply means being arranged to receive from the gas separating means the recovered purge gas” as claimed in claim 1 from which claim 4 depends. Accordingly, neither of Melnychuk et al., Okumura et al., nor Maruyama et al., either alone or in combination, render obvious the invention as claimed in claim 4.

The Examiner rejected dependent claim 21 as being obvious in view of Melnychuk et al. in combination with U.S. Patent No. 5,430,752 ("Basting et al."). The Examiner asserted that "Basting et al. teach using an additional pump (72) to increase the pressure of a gas stream prior to cryogenic separation [as claimed in claim 21]." *Office Action*, ¶ 10. Applicants respectfully submit that claim 21 is not rendered obvious by Melnychuk et al. in view of Basting et al. Assuming *arguendo* that Basting et al. teach pressurizing a gas stream prior to cryogenic separation, Applicants submit that Basting et al. fail to teach "recovering [a] second gas...and recirculating the recovered second gas through at least the pump" as claimed in amended claim 19 from which claim 21 depends. Moreover, as discussed above with respect to amended claim 19, Melnychuk et al. teach that the recovered gas is directed to the hollow light tube (see *Fig. 1*; *Col. 14 lines 10-12*) and fail to teach "recirculating the recovered second gas through at least the pump" as claimed in amended claim 19 from which claim 21 depends. Accordingly, neither Melnychuk et al. nor Basting et al., either alone or in combination, render obvious or achieve the invention as claimed in dependent claim 21.

Dependent claims 28-29 were also rejected as being obvious in view of Melnychuk et al. in combination with U.S. Patent No. 4,750,925 ("MacLean et al."). The Examiner asserted that "MacLean et al. teach a separating means (*Fig. 6*, 'cryogenic distillation unit') that separates a first gas (argon) and a second gas (nitrogen) cryogenically [as claimed in claim 28], and does so by condensing the first gas ("liquid argon") without condensing the second gas (nitrogen) [as claimed in claim 29,]." *Office Action*, ¶ 11. Applicants submit that MacLean et al., either alone or in combination with Melnychuk et al., fails to render obvious the invention as claimed in claims 28 and 29. MacLean et al. is directed to a gas recovery system utilizing a combination of cryogenic and non-cryogenic separating means. *Col. 2 lines 21-29*. Assuming *arguendo* that MacLean et al. teach a cryogenic separating means to separate a first and second gas by condensing the first gas without condensing the second gas, MacLean et al. fails to teach "a method of vacuum pumping, comprising receiving...a second, purge gas for pumping with the first gas...and recirculating the recovered second gas through at least the pump" as claimed in claim 19 from which claims 28-29 depend. In addition, as discussed above in connection with amended claim 19, Melnychuk et al. also fail to teach a method of vacuum pumping comprising "receiving at a pump...a second, purge gas...; recovering the second gas...and recirculating the recovered second gas through at least the pump" as claimed in claim 19 from which claims 28-29

depend. Accordingly, Applicants respectfully submit that neither Melnychuk et al. nor MacLean et al., either alone or in combination, achieve or render obvious the invention as claimed in claims 28-29.

The Examiner also rejected dependent claim 9 as being obvious in view of Melnychuk et al. in combination with U.S. Patent No. 6,644,931 ("Puech"). The Examiner asserted that although "Melnychuk et al. do not expressly teach that the recirculating means comprises means for pressurizing the received first gas...Puech teaches recirculating means (6, 10, 110) for purifying (10), pressurizing (6), and recycling (110) a working gas." *Office Action*, ¶ 12. Applicants respectfully submit that dependent claim 9 is not rendered obvious by Melnychuk et al. or Puech, either alone or in combination. Dependent claim 9 claims that "the recirculating means comprises means for pressurizing the received first gas." Assuming *arguendo* that Puech teaches a recirculating means having means for pressurizing a first gas, Applicants submit that Puech teaches away from a "means for supplying a second, purge gas to be pumped with the first gas" as claimed in claim 1 from which claim 9 depends. Indeed, Puech teaches that during pumping of low thermal conductivity gases the rotor temperature quickly increases. *Col. 2 lines 44-50*. Puech mentions one solution for preventing this is injecting nitrogen or helium into the pump. *Col. 2 lines 51-55*. "However, these additive gases are then mixed with the pure gas, and prevent simple recycling." *Col. 2 lines 54-55* (emphasis added). The problem addressed by Puech's invention is the designing of a vacuum pumping system that "retains the same recycling technique, thus avoiding the need to develop a new pump." *Col. 2 lines 64-67* and *Col. 3 lines 1-3*. Thus, Puech teaches away from "supplying a second, purge gas to be pumped with the first gas" because Puech indicates that this would require designing a new pump to accomplish recycling. *Col. 3 lines 1-3*. In addition, as discussed above with respect to claim 1, Melnychuk et al. fail to teach a "means for supplying a second, purge gas to be pumped with the first gas...the supply means being arranged to receive from the gas separating means the recovered purge gas." (claim 1). Accordingly, neither Melnychuk et al. nor Puech, either alone or in combination, achieve the invention as claimed in claim 9 or render it obvious.

Claims 10-11 were also rejected as being obvious in view of Melnychuk et al. in combination with Puech and MacLean et al. The Examiner asserted that although neither Melnychuk et al. nor Puech "teach that the separating means comprises cryogenic separating means for separating cryogenically the first gas from the gas stream to recover both the first and

second gases...MacLean et al. teach a separating means (*Fig. 6*, 'cryogenic distillation unit') that separates a first gas (argon) and a second gas (nitrogen) cryogenically, and does so by condensing the first gas ('liquid argon') without condensing the second gas (nitrogen)." *Office Action*, ¶ 13. Dependent claim 10 claims that "the separating means comprises cryogenic separating means for separating cryogenically the first gas from the gas stream to recover both the first and second gases. Dependent claim 11 claims that "the cryogenic separating means is arranged to condense the first gas without condensing the second gas." Applicants submit that MacLean et al., either alone or in combination with Melnychuk et al. and/or Puech, fails to achieve the invention as claimed in claims 10 and 11. MacLean et al. is directed to a gas recovery system utilizing a combination of cryogenic and non-cryogenic separating means. *Col. 2 lines 21-29*. Assuming *arguendo* that MacLean et al. teach that the separating means includes a cryogenic separating means arranged to condense the first gas without condensing the second gas, MacLean et al. simply fail to teach a "means for supplying a second, purge gas to be pumped with the first gas...the supply means being arranged to receive from the gas separating means the recovered purge gas" as claimed in claim 1 from which claims 10-11 depend. In addition, as discussed above with respect to claim 9, Puech teaches away from a "means for supplying a second, purge gas to be pumped with the first gas." Accordingly, neither Melnychuk et al., Puech nor MacLean et al., either alone or in combination, render obvious the invention as claimed in claims 10 and 11.

In view of the foregoing remarks, Applicants respectfully submit that rejected claims 1-2, 4, 7-19, 21-22 and 25-33 are neither anticipated nor rendered obvious in view of Melnychuk et al., Okumura et al., Maruyama et al., MacLean et al., Basting et al. or Puech, either alone or in combination. Accordingly, Applicants respectfully submit that claims 1-2, 4, 7-19, 21-22 and 25-33 are allowable and that the application be allowed and promptly passed to issue.

Respectfully submitted,



Ira Lee Zebrak
Registration No. 31,147
Attorney for Applicant(s)
Date:

The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974
Phone: 908-771-6469
Fax: 908-771-6159